



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/721,891	11/26/2003	Takamitsu Soda	01306.000115	5985
5514	7590	04/18/2005	EXAMINER	
FITZPATRICK CELLA HARPER & SCINTO			CHEN, SOPHIA S	
30 ROCKEFELLER PLAZA			ART UNIT	
NEW YORK, NY 10112			PAPER NUMBER	
			2852	
DATE MAILED: 04/18/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/721,891

**Applicant(s)**

SODA ET AL.

**Examiner**

Sophia S. Chen

**Art Unit**

2852

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,6-11 and 14-16 is/are rejected.
- 7) ☒ Claim(s) 3,5,12 and 13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 November 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 11/26/03 & 3/11/04.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Drawings***

1. Figure 10 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.
2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 64 (Figures 1, 2, 5, 6, 7, 8, and 9), 67 (Figures 1, 3, 5, 7, 8, and 9), Sc, Pc, 1c, 2c, 3c, 7c, T1c, and 65c (Figure 9). Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective

action in the next Office action. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: I (page 24, line 3). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to because they are in such poor quality that the reference numerals are not legible. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several

views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

5. The abstract of the disclosure is objected to because of the following informalities:

- a. The abstract exceeds 150 words.
  - b. The abstract includes legal phraseology, such as "comprising" (page 36, line 2), "means" (page 36, line 3), and "said" (page 36, lines 3 through 18).
  - c. The meaning of "La-Sa Lm" (page 36, lines 13-14) is unclear.
- Correction is required. See MPEP § 608.01(b).

6. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

7. The disclosure is objected to because of the following informalities:

- a. Page 2, line 1, "b cause" should be "because".
- b. Page 2, line 2, "f" should be "of".

- c. Page 6, line 2, "directi n" should be "direction".
- d. Page 9, line 2, "th" should be "the".
- e. Page 12, line 3, "th image l ngth" should be "the image length".
- f. Page 16, line 15, "126 m" should be "126 mm".
- g. Page 18, line 1, "embodim nt" should be "embodiment".
- h. Page 19, line 1, "f" should be "of".
- i. Page 25, line 1, "n latent" should be "on latent".
- j. Page 25, line 2, "imag" should be "image".
- k. Page 25, line 3, "th" should be "the".
- l. Page 25, line 19, "La Sa" should be "La<Sa".
- m. Page 26, line 1, "mad" should be "made".
- n. Page 27, line 11, "Sc" should be "Sb".

Appropriate correction is required.

### ***Claim Objections***

- 8. Claims 1-5, 9, and 14-16 are objected to because of the following informalities:
  - a. Claim 1, line 25, "th moving" should be "the moving".
  - b. Claim 4, line 2, there is no antecedent basis for "the plural means". It is unclear whether or not the plural means are the plurality of movable image carriers.
  - c. Claim 4, line 3, "mean" should be "means".
  - d. Claim 9, line 2, there is no antecedent basis for "the plural means". It is unclear whether or not the plural means are the plurality of movable image carriers.
  - e. Claim 9, line 3, "mean" should be "means".

f. Claim 14, line 21, "sec nd imag" should be "second image".

g. Claim 14, line 22, "dir ction" should be "direction".

Appropriate correction is required.

***Claim Rejections – 35 USC §102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 1 and 2 are rejected under 35 U.S.C. 102(e) as being anticipated by Kibune (US Pat. No. 6,574,442 B2, cited in Form PTO-1449).

The patent discloses an image forming apparatus comprising: a plurality of movable image carriers 16, 26, the image carriers 16, 26 forming latent images upon exposure 18, 28 at respective exposing positions to form a toner image at the latent images (column 9, lines 38-40 and Figure 18); a movable intermediate transfer body 10, to which the toner images is transferred from the image carriers 16, 26, for carrying the toner image (column 9, lines 53-58); and contacting means 11 separably contacting to the intermediate transfer body 10 at a contacting position 45 (column 9, lines 49-52), wherein the image carrier 16 located most closely to the contacting position 45 in a direction extending along the intermediate transfer body 10 on a downstream side in a moving direction a of the intermediate transfer body 10 with respect to the contacting

Art Unit: 2852

position 45, defines a first image carrier 16 where a position for transfer between the first image carrier 16 and the intermediate transfer body 10 defines a first transfer position (around roller 41, Figure 18), wherein the image carrier 26 located most closely to the contacting position 45 in a direction extending along the intermediate transfer body on an upstream side in a moving direction  $\underline{a}$  of the intermediate transfer body 10 with respect to the contacting position 45, defines a second image carrier 26 where a position for transfer between the second image carrier 26 and the intermediate transfer body 10 defines a second transfer position (around roller 42, Figure 18), wherein a toner image formed on the intermediate transfer body 10 is transferred onto a transfer material P after passing through the first transfer position (around roller 41) and the second transfer position (around roller 42) again (Figure 18), and wherein formula  $L_a - S_a \geq L_m$  is satisfied where a distance from the contacting position 45 to the first transfer position (around roller 41) along the moving direction  $\underline{a}$  of the intermediate transfer body 10 is set as  $L_a$ , where a distance from the exposing position (around reference numeral 18, Figure 18) on the first image carrier 16 to the first transfer position (around roller 41) along the moving direction of the first image carrier 16 is set as  $S_a$ , and where an image length formed on the intermediate transfer body is set as  $L_m$  (column 5, lines 56-61; column 6, lines 51-52; Figure 18).

The patent further discloses the contacting means 11 is a means for transferring the toner image from the intermediate transfer body 10 to the transfer material P (column 5, lines 53-55).



11. Claims 6, 8, 10, and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Kibune.

The patent discloses an image forming apparatus comprising: a plurality of movable image carriers 16, 26, the image carriers 16, 26 forming latent images upon exposure 18, 28 at respective exposing positions to form a toner image at the latent images (column 9, lines 38-40 and Figure 18); a movable intermediate transfer body 10, to which the toner images is transferred from the image carriers 16, 26, for carrying the toner image (column 9, lines 53-58); and contacting means 61 separably contacting to the intermediate transfer body 10 at a contacting position (Figures 18 and 34), wherein the image carrier 16 located most closely to the contacting position in a direction extending along the intermediate transfer body 10 on a downstream side in a moving direction a of the intermediate transfer body 10 with respect to the contacting position, defines a first image carrier 16 where a position for transfer between the first image carrier 16 and the intermediate transfer body 10 defines a first transfer position (around roller 41, Figure 18), wherein the image carrier 26 located most closely to the contacting position in a direction extending along the intermediate transfer body on an upstream side in a moving direction a of the intermediate transfer body 10 with respect to the contacting position, defines a second image carrier 26 where a position for transfer between the second image carrier 26 and the intermediate transfer body 10 defines a second transfer position (around roller 42, Figure 18), wherein a toner image formed on the intermediate transfer body 10 is transferred onto a transfer material P after passing through the first transfer position (around roller 41) and the second transfer position

Art Unit: 2852

(around roller 42) again (Figure 18), and wherein formula  $L_b + S_b \geq L_m$  is satisfied where a distance from the contacting position to the second transfer position (around roller 42) along the moving route of the intermediate transfer body 10 in a direction reverse to the moving direction  $\underline{a}$  of the intermediate transfer body 10 is set as  $L_b$ , where a distance from the exposing position (around reference numeral 28, Figure 18) on the second image carrier 26 to the second transfer position (around roller 42) along the moving direction of the second image carrier 26 is set as  $S_b$ , and where an image length formed on the intermediate transfer body is set as  $L_m$  (column 5, lines 56-61; column 6, lines 51-52; Figure 18).

The patent further discloses the contacting means 61 is a means for cleaning toner remaining after transfer of the toner image from the intermediate transfer body 10 to the transfer material P (column 10, lines 62-64); inherently, the latent image formation on the second image carrier 26 is done at a time different from contacting operation of the contacting means 61 because the cleaning of the belt 10 is done after the toner image is transferred to the transfer material P (column 10, lines 62-64); and wherein formula  $L_b + S_b + L_a - S_a > L_m$  is satisfied where a distance from the contacting position to the first transfer position (around roller 41) along the moving direction  $\underline{a}$  of the intermediate transfer body 10 is set as  $L_a$ , and where a distance from the exposing position (around reference numeral 18, Figure 18) on the first image carrier 16 to the first transfer position (around roller 41) along the moving direction of the first image carrier 16 is set as  $S_a$  (Figure 18).

12. Claims rejected under 35 U.S.C. 102(e) as being anticipated by Taguchi et al.  
(US Pat. No. 6,801,728 B2)

The patent discloses an image forming apparatus comprising: a plurality of movable image carriers 11, the image carriers 11 forming latent images upon exposure 16 at respective exposing positions to form a toner image at the latent images (column 23, lines 37-65 and Figure 12); a movable intermediate transfer body 31, to which the toner images is transferred from the image carriers 11, for carrying the toner image (column 23, lines 24-29); and contacting means (a belt cleaner) 33 or (a secondary transfer roller) 35 separably contacting to the intermediate transfer body 10 at a contacting position (column 6, lines 43-48 and 54-58; Figures 1 and 12), wherein the image carrier 11 located most closely to the contacting position in a direction extending along the intermediate transfer body 31 on a downstream side in a moving direction 72 of the intermediate transfer body 31 with respect to the contacting position, defines a first image carrier 11 (in the unit 10Y, Figure 12) where a position for transfer between the first image carrier 11 (in the unit 10Y) and the intermediate transfer body 31 defines a first transfer position 14 (in the unit 10Y, Figure 12), wherein the image carrier 11 located most closely to the contacting position in a direction extending along the intermediate transfer body 31 on an upstream side in a moving direction 72 of the intermediate transfer body 31 with respect to the contacting position, defines a second image carrier 11 (in the unit 10K) where a position for transfer between the second image carrier 11 (in the unit 10K) and the intermediate transfer body 31 defines a second transfer position 14 (in the unit 10K, Figure 12), wherein a toner image formed

Art Unit: 2852

on the intermediate transfer body 31 is transferred onto a transfer material 4 after passing through the first transfer position 14 (in the unit 10Y) and the second transfer position 14 (in the unit 10K) again (Figure 12), and wherein formula  $L_b + S_b \geq L_m$  is satisfied where a distance from the contacting position to the second transfer position 14 (in the unit 10K) along the moving route of the intermediate transfer body 31 in a direction reverse to the moving direction 72 of the intermediate transfer body 31 is set as  $L_b$ , where a distance from the exposing position 16 (in the unit 10K) on the second image carrier 11 (in the unit 10K) to the second transfer position 14 (in the unit 10K) along the moving direction of the second image carrier 11 (in the unit 10K) is set as  $S_b$ , and where an image length 78 formed on the intermediate transfer body 31 is set as  $L_m$  (Figure 4B).

The patent further discloses the contacting means 35 is a means for transferring the toner image 78 from the intermediate transfer body 31 to the transfer material 4 (Figure 12); the contacting means 33 is a means for cleaning toner remaining after transfer of the toner image 78 from the intermediate transfer body 31 to the transfer material 4 (column 6, lines 43-50); the contacting means 35, in a case where the plural means 11 come in contact with the intermediate transfer body 31, is the means contacting, at the nearest position to the second transfer position 14 (in the unit 10K), on a downstream side of the second transfer position 14 (in the unit 10K) in the moving direction 72 of the intermediate transfer body 31 (Figure 12); inherently, the latent image formation on the second image carrier 11 is done at a time different from contacting operation of the contacting means 33 because the cleaning of the belt 31 is done after

Art Unit: 2852

the toner image is transferred to the transfer material 4; and wherein formula  $Lb+Sb+La-Sa > Lm$  is satisfied where a distance from the contacting position to the first transfer position 14 (in the unit 10Y) along the moving direction 72 of the intermediate transfer body 31 is set as La, and where a distance from the exposing position 16 (in the unit 10Y) on the first image carrier 11 (in the unit 10Y) to the first transfer position 14 (in the unit 10Y) along the moving direction of the first image carrier 11 (in the unit 10Y) is set as Sa (Figure 12).

13. Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

Art Unit: 2852

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

16. Claims 1, 2, and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sahara (US Pat. No. 6,324,358 B1) in view of Katayanagi et al. (US Pat. No. 6,529,695 B2)

Sahara discloses an image forming apparatus comprising: a plurality of movable image carriers 11a through 11d, the image carriers 11a through 11d forming latent images upon exposure 13a through 13d at respective exposing positions to form a toner image at the latent images (Figure 2); a movable intermediate transfer body 31, to which the toner images is transferred from the image carriers 11a through 11d, for carrying the toner image (column 4, lines 23-29 and Figure 2); and contacting means 36 contacting to the intermediate transfer body 31 at a contacting position  $T_e$  (Figure 2), wherein the image carrier 11d located most closely to the contacting position  $T_e$  in a direction extending along the intermediate transfer body 31 on a downstream side in a moving direction  $R_{31}$  of the intermediate transfer body 31 with respect to the contacting position  $T_e$ , defines a first image carrier 11d where a position for transfer between the first image carrier 11d and the intermediate transfer body 31 defines a first transfer position  $T_d$  (Figure 12), wherein the image carrier 11a located most closely to the contacting position  $T_e$  in a direction extending along the intermediate transfer body 31 on an upstream side in a moving direction  $R_{31}$  of the intermediate transfer body 31 with respect to the contacting position  $T_e$ , defines a second image carrier 11a where a position for transfer between the second image carrier 11a and the intermediate transfer

body 31 defines a second transfer position Ta (Figure 12), wherein a toner image formed on the intermediate transfer body 31 is transferred onto a transfer material P after passing through the first transfer position Td and the second transfer position Ta again (Figure 2), and wherein formula  $La - Sa \geq Lm$  is satisfied where a distance from the contacting position Te to the first transfer position Td along the moving direction R31 of the intermediate transfer body 31 is set as La, where a distance from the exposing position (around reference numeral 13d, Figure 2) on the first image carrier 11d to the first transfer position Td along the moving direction of the first image carrier 11d is set as Sa, and where an image length z formed on the intermediate transfer body 31 is set as Lm (column 7, line 61 and Figure 4).

Sahara further discloses the contacting means 36 is a means for transferring the toner image from the intermediate transfer body 31 to the transfer material P (column 5, line 66 to column 6, line 9); and wherein the contacting means 36, in a case where the plural means 11a through 11d come in contact with the intermediate transfer body 31, is the means contacting, at the nearest position to the first transfer position Td, on an upstream side of the first transfer position Td in the moving direction R31 on the intermediate transfer body 31 (Figure 2).

Sahara differs from the instant claimed invention in not disclosing the contacting means being separably contacting to the intermediate transfer body at the contacting position.

Katayanagi et al. discloses an image forming apparatus comprising a plurality of image carriers 2Y, 2M, 2C, and 2K; a movable intermediate transfer body 15; and

contacting means 7 separably contacting to the intermediate transfer body 15 at a contacting position (Figures 1 and 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the separation/contacting mechanism as taught by Katayanagi et al. to the contacting means of Sahara so that the copy productivity is secured to be effective while preventing an adverse effect on the image quality (Katayanagi et al., column 6, lines 27-31).

17. Claims 6, 7, 9, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sahara in view of Katayanagi et al.

Sahara discloses an image forming apparatus comprising: a plurality of movable image carriers 11a through 11d, the image carriers 11a through 11d forming latent images upon exposure 13a through 13d at respective exposing positions to form a toner image at the latent images (Figure 2); a movable intermediate transfer body 31, to which the toner images is transferred from the image carriers 11a through 11d, for carrying the toner image (column 4, lines 23-29 and Figure 2); and contacting means 36 contacting to the intermediate transfer body 31 at a contacting position  $T_e$  (Figure 2), wherein the image carrier 11d located most closely to the contacting position  $T_e$  in a direction extending along the intermediate transfer body 31 on a downstream side in a moving direction  $R_{31}$  of the intermediate transfer body 31 with respect to the contacting position  $T_e$ , defines a first image carrier 11d where a position for transfer between the first image carrier 11d and the intermediate transfer body 31 defines a first transfer position  $T_d$  (Figure 12), wherein the image carrier 11a located most closely to the



contacting position  $T_e$  in a direction extending along the intermediate transfer body 31 on an upstream side in a moving direction  $R_{31}$  of the intermediate transfer body 31 with respect to the contacting position  $T_e$ , defines a second image carrier 11a where a position for transfer between the second image carrier 11a and the intermediate transfer body 31 defines a second transfer position  $T_a$  (Figure 12), wherein a toner image formed on the intermediate transfer body 31 is transferred onto a transfer material P after passing through the first transfer position  $T_d$  and the second transfer position  $T_a$  again (Figure 2), and wherein formula  $L_b + S_b \geq L_m$  is satisfied where a distance from the contacting position  $T_e$  to the second transfer position  $T_a$  along the moving route of the intermediate transfer body 31 in a direction reverse to the moving direction  $R_{31}$  of the intermediate transfer body 31 is set as  $L_b$ , where a distance from the exposing position (around reference numeral 13a, Figure 2) on the second image carrier 11a to the first transfer position  $T_a$  along the moving direction of the first image carrier 11a is set as  $S_b$ , and where an image length  $z$  formed on the intermediate transfer body 31 is set as  $L_m$  (column 7, line 61 and Figure 4).

Sahara further discloses the contacting means 36 is a means for transferring the toner image from the intermediate transfer body 31 to the transfer material P (column 5, line 66 to column 6, line 9); wherein the contacting means 36, in a case where the plural means 11a through 11d come in contact with the intermediate transfer body 31, is the means contacting, at the nearest position to the second transfer position  $T_a$ , on a downstream side of the second transfer position  $T_a$  in the moving direction  $R_{31}$  of the intermediate transfer body 31 (Figure 2); and wherein formula  $L_b + S_b + L_a - S_a > L_m$  is

satisfied where a distance from the contacting position  $T_e$  to the first transfer position  $T_d$  along the moving direction  $R_{31}$  of the intermediate transfer body 31 is set as  $L_a$ , and where a distance from the exposing position (near 13d (Figure 2) on the first image carrier 11d to the first transfer position  $T_d$  along the moving direction of the first image carrier 11d is set as  $S_a$  (Figure 4).

Sahara differs from the instant claimed invention in not disclosing the contacting means being separably contacting to the intermediate transfer body at the contacting position.

Katayanagi et al. discloses an image forming apparatus comprising a plurality of image carriers 2Y, 2M, 2C, and 2K; a movable intermediate transfer body 15; and contacting means 7 separably contacting to the intermediate transfer body 15 at a contacting position (Figures 1 and 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the separation/contacting mechanism as taught by Katayanagi et al. to the contacting means of Sahara so that the copy productivity is secured to be effective while preventing an adverse effect on the image quality (Katayanagi et al., column 6, lines 27-31).

18. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sahara in view of Katayanagi et al.

Sahara discloses an image forming apparatus comprising: a plurality of movable image carriers 11a through 11d, the image carriers 11a through 11d forming latent images upon exposure 13a through 13d at respective exposing positions to form a toner

image at the latent images (Figure 2); a movable intermediate transfer body 31, to which the toner images is transferred from the image carriers 11a through 11d, for carrying the toner image (column 4, lines 23-29 and Figure 2); and contacting means 36 contacting to the intermediate transfer body 31 at a contacting position  $T_e$  (Figure 2), wherein the image carrier 11d located most closely to the contacting position  $T_e$  in a direction extending along the intermediate transfer body 31 on a downstream side in a moving direction  $R_{31}$  of the intermediate transfer body 31 with respect to the contacting position  $T_e$ , defines a first image carrier 11d where a position for transfer between the first image carrier 11d and the intermediate transfer body 31 defines a first transfer position  $T_d$  (Figure 12), wherein the image carrier 11a located most closely to the contacting position  $T_e$  in a direction extending along the intermediate transfer body 31 on an upstream side in a moving direction  $R_{31}$  of the intermediate transfer body 31 with respect to the contacting position  $T_e$ , defines a second image carrier 11a where a position for transfer between the second image carrier 11a and the intermediate transfer body 31 defines a second transfer position  $T_a$  (Figure 12), wherein a toner image formed on the intermediate transfer body 31 is transferred onto a transfer material P after passing through the first transfer position  $T_d$  and the second transfer position  $T_a$  again (Figure 2), and wherein formula  $L_c + S_a - S_b \geq L_m$  is satisfied where a distance from the exposing position (around reference numeral 13d, Figure 2) on the first image carrier 11d to the first transfer position  $T_d$  along the moving direction of the first image carrier 11d is set as  $S_a$ , where a distance from the exposing position (around reference numeral 13a, Figure 2) on the second image carrier 11a to the second transfer position

Ta along the moving direction of the second image carrier 11a is set as Sb, where a distance ( $x+x+x = 3x$ ; Figure 1) from the first transfer position Td to the second transfer position Ta along the moving direction R31 of the intermediate transfer body 31 is set as Lc, and where an image length z formed on the intermediate transfer body 31 is set as Lm (column 7, line 61 and Figure 4).

Sahara further discloses the contacting means 36 is a means for transferring the toner image from the intermediate transfer body 31 to the transfer material P (column 5, line 66 to column 6, line 9).

Sahara differs from the instant claimed invention in not disclosing the contacting means being separably contacting to the intermediate transfer body at the contacting position.

Katayanagi et al. discloses an image forming apparatus comprising a plurality of image carriers 2Y, 2M, 2C, and 2K; a movable intermediate transfer body 15; and contacting means 7 separably contacting to the intermediate transfer body 15 at a contacting position (Figures 1 and 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the separation/contacting mechanism as taught by Katayanagi et al. to the contacting means of Sahara so that the copy productivity is secured to be effective while preventing an adverse effect on the image quality (Katayanagi et al., column 6, lines 27-31).

19. Claims 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sahara in view of Kibune.

Sahara discloses an image forming apparatus comprising: a plurality of movable image carriers 11a through 11d, the image carriers 11a through 11d forming latent images upon exposure 13a through 13d at respective exposing positions to form a toner image at the latent images (Figure 2); a movable intermediate transfer body 31, to which the toner images is transferred from the image carriers 11a through 11d, for carrying the toner image (column 4, lines 23-29 and Figure 2); and contacting means 37 contacting to the intermediate transfer body 31 at a contacting position (Figure 2), wherein the image carrier 11d located most closely to the contacting position in a direction extending along the intermediate transfer body 31 on a downstream side in a moving direction R31 of the intermediate transfer body 31 with respect to the contacting position, defines a first image carrier 11d where a position for transfer between the first image carrier 11d and the intermediate transfer body 31 defines a first transfer position Td (Figure 12), wherein the image carrier 11a located most closely to the contacting position in a direction extending along the intermediate transfer body 31 on an upstream side in a moving direction R31 of the intermediate transfer body 31 with respect to the contacting position, defines a second image carrier 11a where a position for transfer between the second image carrier 11a and the intermediate transfer body 31 defines a second transfer position Ta (Figure 12), wherein a toner image formed on the intermediate transfer body 31 is transferred onto a transfer material P after passing through the first transfer position Td and the second transfer position Ta again (Figure 2), and wherein formula  $Lc+Sa-Sb \geq Lm$  is satisfied where a distance from the exposing position (around reference numeral 13d, Figure 2) on the first image carrier 11d to the

Art Unit: 2852

first transfer position Td along the moving direction of the first image carrier 11d is set as Sa, where a distance from the exposing position (around reference numeral 13a, Figure 2) on the second image carrier 11a to the second transfer position Ta along the moving direction of the second image carrier 11a is set as Sb, where a distance  $(x+x+x = 3x)$ ; Figure 1) from the first transfer position Td to the second transfer position Ta along the moving direction R31 of the intermediate transfer body 31 is set as Lc, and where an image length z formed on the intermediate transfer body 31 is set as Lm (column 7, line 61 and Figure 4).

Sahara further discloses the contacting means 37 is a means for cleaning toner remaining after transfer of the toner image from the intermediate transfer body 31 to the transfer material P (column 4, line 67 to column 5, line 5).

Sahara differs from the instant claimed invention in not disclosing the contacting means being separably contacting to the intermediate transfer body at the contacting position.

Kibune discloses an image forming apparatus comprising a plurality of image carriers 16, 26; a movable intermediate transfer body 10; and contacting means 61 separably contacting to the intermediate transfer body 10 at a contacting position (Figure 34).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the separation/contacting mechanism as taught by Kibune to the contacting means of Sahara to prolong the life of the contacting (cleaning) means.

***Allowable Subject Matter***

20. Claims 3, 5, 12, and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Other Prior Art***

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Shimazawa et al. (US Pat. No. 6,240,271 B1) discloses an image forming apparatus comprising a plurality of image carriers; an intermediate transfer body; and a contacting means separably contacting to the intermediate transfer body at a contacting position.

Morikami et al. (US Pat. No. 6,418,294 B2) discloses an image forming apparatus comprising a plurality of image carriers; an intermediate transfer body; and a contacting means contacting to the intermediate transfer body at a contacting position.

Kanekura et al. (US Pat. Pub. No. US 2003/0223785 A1) discloses an image forming apparatus comprising a plurality of image carriers; an intermediate transfer body; and a contacting means contacting to the intermediate transfer body at a contacting position.

Sawai (US Pat. No. 6,768,892 B2) discloses an image forming apparatus comprising a plurality of image carriers; an intermediate transfer body; and a contacting means separably contacting to the intermediate transfer body at a contacting position.

Saitoh et al. (US Pat. No. 6,839,531 B2) discloses an image forming apparatus comprising a plurality of image carriers; an intermediate transfer body; and a contacting means separably contacting to the intermediate transfer body at a contacting position.

Mishima (JP 2000-253223 A) discloses an image forming apparatus comprising a plurality of image carriers; an intermediate transfer body; and a contacting means separably contacting to the intermediate transfer body at a contacting position.

Inoue (JP 2001-343807 A) discloses an image forming apparatus comprising a plurality of image carriers; an intermediate transfer body; and a contacting means contacting to the intermediate transfer body at a contacting position.

#### ***Contact Information***

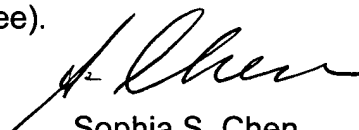
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sophia S. Chen whose telephone number is (571) 272-2133. The examiner can normally be reached on M-F (7:00-3:00) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Arthur Grimley can be reached on (571) 272-2136. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



Art Unit: 2852

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Sophia S. Chen  
Primary Examiner  
Art Unit 2852

Ssc  
April 15, 2005